Claims

1. A MEMS resonator comprising:

an input electrode for inputting a signal;

an output electrode for outputting a signal; and

an oscillator facing the input electrode and the output electrodes via a space, and

the MEMS resonator characterized in that the output electrode has an electrode for outputting a balanced signal.

2. A MEMS resonator comprising:

an input electrode for inputting a signal;

an output electrode for outputting a signal; and

an oscillator facing the input electrode and the output electrode via a space,

the MEMS resonator characterized in that the output electrode has an electrode for inputting an unbalanced signal and outputting a balanced signal.

3. The MEMS resonator according to claim 2, characterized in that:

the output electrode includes a first output electrode and a second output electrode disposed, on one side of the input electrode and spaced apart from each other;

the first output electrode is disposed at a position having a phase different by 180° from a phase of the input electrode; and

the second output electrode is disposed at a position having a same phase as the phase of the input electrode.

4. The MEMS resonator according to claim 3, characterized

in that:

the first output electrode is disposed on both sides of the second output electrode.

5. The MEMS resonator according to claim 2, characterized in that:

the output electrode includes a first output electrode and a second output electrode;

the input electrode includes a plurality of input electrodes;

the first output electrode is provided the same number as the number of the plurality of input electrodes, the first output electrodes and the plurality of input electrodes are disposed alternately, and at positions having phases different by 180° from a phase of each of the input electrodes; and

the second output electrode is disposed at a position opposite to the input electrode of the first output electrode disposed at a last end of a layout of the input electrodes and the first output electrodes, and at a position having a same phase as the phase of each of the input electrodes.

6. A MEMS resonator comprising:

an input electrode for inputting a signal;

an output electrode for outputting a signal; and

an oscillator facing the input electrode and the output electrode via a space,

the MEMS resonator in the microelectromechanical system characterized in that:

a balanced signal is input to the input electrode; and

a balanced signal is output from the output electrode.

7. The MEMS resonator according to claim 6, characterized in that:

the input electrode includes a first input electrode and a second input electrode;

the output electrode includes a first output electrode and a second output electrode;

the first input electrode and the first output electrode are disposed in such a manner that amplitude phases of the oscillator at positions of the first input electrode and the first output electrode become a same phase; and

the second input electrode and the second output electrode are disposed in such a manner that amplitude phases of the oscillator at positions of the second input electrode and the second output electrode become a same phase and different by 180° from the phase of the oscillator.

8. The MEMS resonator according to claim 7, characterized in that:

the first input electrode, the second output electrode, the first output electrode and the second input electrode are disposed in this order.

9. The MEMS resonator according to claim 7, characterized in that:

the first input electrode, the second input electrode, the first output electrode and the second output electrode are disposed in this order.

10. The MEMS resonator according to claim 6, characterized in that:

the input electrode includes a plurality of input electrodes;

the output electrode includes a plurality of output electrodes;

a first input electrode of the input electrodes and a first output electrode of the output electrodes are disposed in such a manner that amplitude phases of the oscillator at positions of the first input electrode and the first output electrode become a same phase;

a second input electrode of the input electrodes and a second output electrode of the output electrodes are disposed in such a manner that amplitude phases of the oscillator at positions of the second input electrode and the second output electrode become a same phase and different by 180° from the amplitude phases of the oscillator at a position of the first input electrode;

remaining input electrodes of the input electrodes are disposed in such a manner that the remaining input electrodes have a same phase as an amplitude phase of the oscillator at a position of the first input electrode or the second input electrode; and

remaining output electrodes of the output electrode are disposed in such a manner that the remaining output electrodes have a same phase as an amplitude phase of the oscillator at a position of the first output electrode or the second output electrode.

11. A driving method for a MEMS resonator , the MEMS resonator having:

an input electrode for inputting a signal;

an output electrode for outputting a signal; and

an oscillator facing the input electrode and the output electrode via a space,

the driving method for the MEMS resonator in the microelectromechanical system, characterized by comprising the step of inputting an unbalanced signal and outputting a balanced signal.

12. The driving method for a MEMS resonator according to claim 11, characterized in that:

the output electrode includes a first output electrode and a second output electrode, disposed on one side of the input electrode and spaced apart from each other;

the first output electrode is disposed at a position having a phase different by 180° from a phase of the input electrode; and

the second output electrode is disposed at a position having a same phase as the phase of the input electrode.

13. The driving method for a MEMS resonator according to claim 12, characterized in that:

the first output electrode is disposed on both sides of the second output electrode.

14. The driving method for a MEMS resonator according to claim 11, characterized in that:

the output electrode includes a first output electrode and a second output electrode;

the input electrode includes a plurality of input electrodes;

the first output electrode is provided the same number as the number of the plurality of input electrodes, the first output electrodes and the plurality of input electrodes are disposed alternately, and at positions having phases different by 180° from a phase of each of the input electrodes; and

the second output electrode is disposed at a position opposite to the input electrode of the first output electrode disposed at a last end of a layout of the input electrodes and the first output electrode, and at a position having a same phase as the phase of each of the input electrodes.

15. A frequency filter characterized by comprising a MEMS resonator , the MEMS resonator having:

an input electrode for inputting a signal;

an output electrode for an outputting signal; and

an oscillator facing the input electrode and the output electrode via a space,

the MEMS resonator in the microelectromechanical system characterized in that the output electrode has an electrode for inputting an unbalanced signal and outputting a balanced signal.

16. The frequency filter according to claim 15, characterized in that:

the output electrode includes a first output electrode and a second output electrode, disposed on one side of the input electrode and spaced apart from each other;

the first output electrode is disposed at a position having a phase different by 180° from a phase of the input electrode; and

the second output electrode is disposed at a position having a same phase as the phase of the input electrode.

17. A frequency filter comprising a MEMS resonator , the MEMS resonator having:

an input electrode for inputting a signal;

an output electrode for outputting a signal; and

an oscillator facing the input electrode and the output electrode via a space,

the frequency filter characterized in that a balanced signal is input to the input electrode and a balanced signal is output from the output electrode.

18. The frequency filter according to claim 17, characterized in that:

the input electrode includes a first input electrode and a second input electrode;

the output electrode includes a first output electrode and a second output electrode;

the first input electrode and the first output electrode are disposed in such a manner that amplitude phases of the oscillator at positions of the first input electrode and the first output electrode become a same phase; and

the second input electrode and the second output electrode are disposed in such a manner that amplitude phases of the oscillator at positions of the second input electrode and the second output electrode become a same phase and different by 180° from the phase of the oscillator.

19. A manufacture method for a MEMS resonator , the MEMS resonator having:

an input electrode for inputting a signal;

an output electrode for outputting a signal; and

an oscillator facing the input electrode and the output electrode via a space,

the manufacture method characterized by comprising the steps of:

forming the input electrode and the output electrode at the same time;

forming a first input electrode and a second input electrode as the input electrodes;

forming a first output electrode and a second output electrode as the output electrodes;

disposing the first input electrode and the first output electrode in such a manner that amplitude phases of the oscillator at positions of the first input electrode and the first output electrode become a same phase; and

disposing the second input electrode and the second output electrode in such a manner that amplitude phases of the oscillator at positions of the second input electrode and the second output electrode become a same phase and different by 180° from the phase of the oscillator.